BIOLUBRICANTS FROM RAPESEED GROWN ON CONTAMINATED LAND (BYE/5/004) D1 New

CORE FINANCING

YEAR	Experts		Group Activity	Equipment	Fellowships		Scientific Visits		Group Training	Sub-Contracts	Misc. Comp.	TOTAL
	m/d	US $	US $	US $	m/d	US $	m/d	US $	US $	US $	US $	US $
1997	1/12	18,480	0	100,000	6/0	18,900	2/0	19,200	0	0	0	156,580
1998	1/18	22,320	0	240,000	3/0	9,900	0/0	0	0	0	0	272,220
1999	0/21	10,290	0	140,000	6/0	20,700	0/0	0	0	0	0	170,990

First Year Approved: 1997

OBJECTIVES: To establish a pilot plant for the production of biolubricants from locally produced rapeseed oil grown on contaminated agricultural land.

BACKGROUND: Over 1.4 million hectares of prime agricultural land in Belarus are contaminated by radionuclides (mostly Cs-137 and Sr-90) as a result of the Chernobyl nuclear accident. The authorities consider this land unsafe to produce foodstuffs, and consumers are wary of purchasing food grown in the Chernobyl region even though they may comply with international radiological safety standards. Belarus imports from Russia almost all its lubricants and fuel requirements for energy, electricity and transport. An alternative use for contaminated land is to grow oilseeds for lubricants and possibly biofuels. Early studies have shown that the oil produced by a number of varieties of rapeseed and linseed is almost devoid of Cs-137 and Sr-90. Under the project BYE/5/002, approved as part of the 1995-96 programme, the Agency supported field trials on rapeseed cultivation on contaminated land in order to select varieties which partition radionuclides into the non-oil fraction of the plant. The Agency provided equipment, training and expert services in 1995 to the Belarussian Research

Institute for Soil Science and Agrochemistry (BRISSA) to analyse radionuclides in seed oil, straw, oilseed meal and soil. A logical extension of the project would be to assist BRISSA to evaluate: (1) the industrialization of rapeseed oil into biolubricants and possibly biofuel, (2) the practical and economic utilization of contaminated oilseed meal and straw, and (3) the ability of rapeseed and other oilseeds such as linseed and sunflower to biologically decontaminate land. The productivity of livestock in the contaminated zone and elsewhere in Belarus is limited by a shortage of protein concentrate. Oilseed meal produced as a by-product of the crushing process is an excellent source of protein for livestock. Trials on suitable supplementation levels of contaminated rapeseed meal will be conducted in combination with the utilization of Prussian Blue binders produced in Belarus. The effect of the rapeseed cropping on the overall decontamination of the land will also be assessed as will the relative effectiveness of harvesting and concentrating contaminated rapeseed straw, its use as feed or bedding, and its disposal after controlled burning. Every year the Government provides additional assistance to the agricultural sector in the contaminated zones in order to produce ecologically safe farm products, but its financial resources are limited. This project will be part of the national programme for the utilization of the contaminated areas.

PROJECT PLAN: During the initial phase of the project, activity will focus on rapeseed production and utilization of the seed. This will include: improvement of cultivation practices of the best rapeseed varieties under local conditions in order to optimize productivity; the definition of appropriate husbandry practices for spring and winter sowing; determination of the appropriate rate of application of Prussian Blue to contaminated rapeseed meal to ensure that beef and dairy produce comply with national food safety limits; further development of the BRISSA laboratory for measuring Cs-137 and Sr-90 in compliance with IAEA quality assurance standards; the identification of appropriate technologies for processing rapeseed oil into lubricants and forecast of the economic feasibility of biolubricant production; and establishing a laboratory with the capability for measuring biolubricant quality. The second phase of the project will be directed towards the establishment of an operational plant for biolubricants, the production and qualitative assessment of biolubricants and drawing up a plan for further industrialization. This phase will also include enlargement of the area under winter and spring rape in the radioactive contamination zone and a visit of an Agency specialist to assess the quality of the rapeseed oils. The project will include research and manufacturing activities. Project activities will be conducted by staff of the Ministry of Agriculture and Food (mostly BRISSA) and the Ministry for Emergency and Population Protection. BRISSA has its own agricultural experimental farm (4950 ha) in the contaminated zone.

NATIONAL COMMITMENT: Adequate land, seed, fillage and harvesting implements, transport, etc., in the contaminated zone will be available. Laboratory infrastructure at BRISSA will be upgraded to comply with international basic safety standards and to ensure the accuracy of radionuclide measurements.

AGENCY INPUT: Expert services in radioanalytical procedures, on the installation and operation of processing plants for converting rapeseed oil into biolubricants, and on the utilization of the rapeseed oil by-products; laboratory equipment for radiochemical and biolubricant analysis and equipment for the pilot plant; training in radiochemical analysis and on the processing of rapeseed and biodiesel.

PROJECT IMPACT: In the long term, the establishment of a biolubricant and possibly a biofuel industry will create employment and reduce dependence on imported materials. Productivity of soils will be increased and the land decontamination process will speed up through the employment of ecologically safe activities. Rapeseed meal will provide the livestock industry with a cheap source of protein. The results of the project will be directly applied at the farm level in the contaminated zones. The project will promote a significant increase in the use of contaminated land for agricultural production.